

## PAPER MAKING ✓ OCT 18 1917 ✓ 5

## SYNOPSIS OF FILM

1. Material from which Paper is Made.
2. Piles of Logs at Mill.
3. Reducing Logs to Chips and Screening.
4. Chip Conveyor to Top of Digester.
5. Base of Digester 40' x 10' with Steam Inlet.
6. Blow Pits where Chemicals are Washed from Pulp.
7. Washing Chemicals from Pulp in Tanks.
8. Paper Machine.
9. Pressure Rolls to Remove Excess of Water.
10. Removing Pulp Laps from Roll.
11. Beating Engine for Macerating Pulp and Waste Paper.
12. Wetting Pulp to Flow Evenly over Felt.
13. Calender Rolls (Ironing Machine).
14. Stacking Paper Sheets.
15. Trimming and Reeling Paper.

## PAPER MAKING

THE three processes involved in the manufacture of paper from rags, straw, esparto, wood, or any other material, are: first, to reduce the raw material to pulp; next, to dilute the pulp so that the fibres may be easily separated when the liquid is pressed out, and then to deposit the pulp in the form of a sheet.

Materials are reduced to pulp either mechanically or chemically. In the film here we have illustrated the process of making Sulphite pulp.

The two short views at the beginning show us the logs at the river's edge, awaiting the spring freshets to carry them down stream to the mills. The logs are cut and their bark is usually removed in the woods. They are then put in immense piles as here shown and are carried in horse-drawn cars to the mill as needed.

The next scene shows how the three-feet-four-inch logs are fed into the chute of a "chipper" which acts much after the manner of a pencil sharpener, reducing the logs to chips.

These chips are now screened and only those that will pass through the mesh are used. The others are returned for further grinding.

The chips are then carried on an endless conveyor as shown in the picture, to the top of the mill where they are dumped into a huge forty-by-ten-foot acid-proof tank called a "digester" and containing a chemical solvent whose chief ingredient is sulphurous acid. This is the so-called "liquor" of paper making and its preparation is most important. The digester is now sealed, live steam is introduced through the pipe shown in the picture, and the chips are

cooked from eight to twelve hours. This process dissolves all of the intercellular fibres and leaves nearly pure cellulose.

From the "digester" the cellulose is poured into the "blow pits"—huge cylindrical vats—where it is thoroughly washed. The moving pulp or "half stuff," as it is now called, is run into large open tanks where it is again washed to remove any trace of acid.

We now come to the paper making machine. It is extremely long as will be shown later. Its ends are known respectively as the "wet end" and the "dry end."

In the wet end is a large porous roll immersed in the pulp. About the rolls on this machine an endless wire screen revolves which presses the pulp against and between the rolls, eliminating most of the water. As the rolls gather the pulp, it is removed and folded for further treatment. Each of these folded laps weighs about twenty-five pounds.

These laps, together with waste from the reeling end of the machine, are now placed in a "beating engine," where the pulp is macerated to an even consistency, and in which, according to the kind of paper to be made, is sometimes placed a filler (such as sulphate of lime, clay, asbestos), or sizing (alum, resin, soap, etc.), to give the paper a "body" and the smooth finish which prevents blotting.

We now start at the beginning of the paper machine. The wet end is now shown, in which the pulp is sprayed by jets of water to distribute the pulp evenly on a reciprocating woolen felt blanket. Most of the water goes through the blanket before the pulp reaches the first rolls, which press out the remainder. The pulp next passes between slow moving steam-heated rolls which gradually dry it and it now becomes paper. Further along are many rolls, one

placed above the other, through which the paper passes. These polished steel rolls are called a calender and they iron out the paper, giving it a hard, smooth finish.

At the extreme end of the machine, the paper is reeled on either an iron or a paper core, the unfinished edges being trimmed before it is wound.

The paper on the roll here shown is heavy, brown paper, and is used for wrapping automobile tires, etc.

The last scene shows the cutting machine with its revolving knives, the large sheets of paper as they come out of the machine, and the manner in which these sheets are stacked.

## QUESTIONS, TOPICS, SUGGESTIONS

1. To what use is the bark of the logs put?
2. What kind of paper is made from rags?
3. What kind is made of wood pulp?
4. What is esparto? Where obtained?
5. Name the men who have invented machines and processes for making paper.
6. What is the present condition of the wood-paper market?
7. What kinds of wood are used for making paper?
8. What states lead in paper manufacture? What city is called the "paper city"?
9. Name household utensils made of paper.
10. Of what materials is newspaper made? Writing paper? Tissue paper? Bank note paper? Blotting paper?
11. Look up the meaning of "cellulose."
12. Describe a hand printing press. A cylinder power press. Go to a newspaper press room and see the immense rolls of paper as they are fed into the press.

## REFERENCES

- SURFACE, H. E. Paper pulps from various forest woods. U. S. Forest Service, Wash., 1912, 29 pp. (with 55 specimens of pulp).
- WATT, A. The art of paper making. D. Van Nostrand Co., N. Y., 1907, 260 pp.



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